

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N9/00 C12N9/12 C12N9/10 C12P19/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal, BIOSIS, EMBL

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 19993 A (US GOV AS REPRESENTED BY DEPT ;UNIV MARYLAND (US); TRUCKSIS MICHEL) 22 March 2001 (2001-03-22) e.g. SEQ ID NO:8 page 42, line 16 -page 43, line 27; claim 30	1
X	SATTler ISABEL ET AL: "Cloning, Sequencing, and Expression of the Uroporphyrinogen III Methyltransferase cobA Gene of Propionibacterium freudenreichii (shermanii)." JOURNAL OF BACTERIOLOGY, vol. 177, no. 6, 1995, pages 1564-1569, XP002217286 ISSN: 0021-9193 abstract	1,2,16



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * & * document member of the same patent family

Date of the actual completion of the international search

10 December 2003

Date of mailing of the international search report

22/12/2003

Name and mailing address of the ISA

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE EMBL 'Online! 2 May 2001 (2001-05-02) FLEISCHMANN ET AL.: "WHole genome comparison of Mycobacterium tuberculosis clinical and laboratory strains" Database accession no. AE007116 XP002217287 abstract</p> <p>---</p>	6-9
A	<p>BLANCHE ET AL.: "Vitamin B12: How the prolem of its biosynthesis was solved" ANGEW. CHEM. INT. ED. ENGL., vol. 34, 1995, page 383-411 XP001118226 cited in the application the whole document</p> <p>---</p>	
X	<p>COLE S T ET AL: "Deciphering the biology of Mycobacterium tuberculosis from the complete genome sequence" NATURE, MACMILLAN JOURNALS LTD. LONDON, GB, vol. 393, 11 June 1998 (1998-06-11), pages 537-544, XP002087941 ISSN: 0028-0836 the whole document & DATABASE EMBL 'Online! 20 February 1998 (1998-02-20) COLE ET AL.: "Mycobacteium tuberculosis H37Rv" Database accession no. AL021929 abstract</p> <p>---</p>	1-16
A	<p>POLLICH M ET AL: "IDENTIFICATION AND SEQUENCE ANALYSIS OF GENES INVOLVED IN LATE STEPS OF COBALAMIN (VITAMIN B12) SYNTHESIS IN RHODOBACTER CAPSULATUS" JOURNAL OF BACTERIOLOGY, WASHINGTON, DC, US, vol. 177, no. 15, 1 August 1995 (1995-08-01), pages 4481-4487, XP000616401 ISSN: 0021-9193</p> <p>---</p>	
X	<p>WO 91 11518 A (RHONE POULENC BIOCHIMIE) 8 August 1991 (1991-08-08) abstract; figure 41; example 5</p> <p>---</p>	6-16,27
A	<p>& DATABASE EMBL 'Online! 5 July 2002 (2002-07-05) "P. denitrificans SstI-Sst-BamHI 3855bp fragment" Database accession no. A30215 abstract</p> <p>---</p> <p style="text-align: center;">-/--</p>	1-5,23, 24

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ROESSNER: "Isolation and characterization of 14 additional genes specifying the anaerobic biosynthesis of cobalamin (vitamine B12) in Propionibacterium freudenreichii (P. shermanii)" MICROBIOLOGY, vol. 148, June 2002 (2002-06), pages 1845-1853, XP002229077 the whole document -----	1-16, 25-27

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-16, 27, 28, partially, 17 and 18 completely

Invention I (claims 1-16, 27, 28, partially, 17 and 18 completely)

Polypeptide, polynucleotide, vector, host cell, process of producing a polypeptide, composition comprising a polypeptide, and a process for producing vitamin B12 in so far as the subject-matter relates to SEQ ID NO: 1 and 2; a process for the preparation of an amine

2. Claims: 1-16, 27, 28, partially, 19-22 completely

Invention II:

as above, but with respect to SEQ ID NO: 3 and 4; processes for the preparation of a phosphate containing compound and a nucleotidy-containing compound

3. Claims: 1-16, 27, 28, partially, 23 and 24 completely

Invention III:

as above, but with respect to SEQ ID NO: 5 and 6; process for the preparation of an aryl-containing compound

4. Claims: 1-16, 27, 28, partially, 25 and 26 completely

Invention IV:

as above but with respect to SEQ ID NO: 8 and 9; process for the preparation of an adenosine-containing compound

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP 03/08216

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 0119993	A	22-03-2001	AU WO	7383500 A 0119993 A2		17-04-2001 22-03-2001
WO 9111518	A	08-08-1991	FR AT CA CN DE DE DK EP ES WO HU JP JP JP RU US	2657622 A1 175237 T 2072023 A1 1054799 A ,B 69130704 D1 69130704 T2 516647 T3 0516647 A1 2128317 T3 9111518 A1 63458 A2 3452316 B2 5506570 T 2003230389 A 2136753 C1 6656709 B1		02-08-1991 15-01-1999 01-08-1991 25-09-1991 11-02-1999 27-05-1999 25-05-1999 09-12-1992 16-05-1999 08-08-1991 30-08-1993 29-09-2003 30-09-1993 19-08-2003 10-09-1999 02-12-2003

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